Healthcare Analytics in Navy Medicine
Perspectives and Methods for Decision-Making

FOCUS ON OBSTETRIC SERVICES

Understanding the Workforce Challenges of the OBGYN Community

Elizabeth M. Adriano, MD, FACOG, CDR MC USN
Amy L. O'Boyle, MD, FACOG, FACS, CDR MC USN

The stated mission of Navy Medicine is to "maintain the fighting force." In today's military, where women comprise an ever growing number of Sailors, obstetric care of our service members and dependent family members has gained more attention, particularly in light of an increased attention to funding within the MHS and the growing demand to insure quality services and patient satisfaction. The reproductive health status of Sailors and the impact of this status on mission readiness are competing demands for those responsible for providing Women's Health Services. The pressure to continually deliver comprehensive, high quality, patient-centered healthcare to both female service members and the wives of our Sailors ultimately rests on the Women's Health Services providers within our military treatment facilities.

Obstetric care in the military may seem like an oxymoron, but as more women are serving in an active duty status, their need for quality reproductive care will often bring up the question of which providers are best qualified to provide this care. Our Navy providers who serve alongside our Sailors are arguably the best. When it comes to understanding mission readiness, our military providers fit the bill. As OBGYN physicians, we not only deliver babies but also provide contraceptive and preventive care for women, treat abnormal pregnancy, and manage the many gynecologic disorders that occur throughout a woman's lifetime, from adolescence well into menopause. Such disorders often require OBGYN surgical expertise to include management of miscarriage, ectopic pregnancy, heavy menstrual cycles, urinary incontinence, pain, infertility and even cancer. The training required includes a rigorous four-year residency program after completion of medical school.

The delivery of quality women's healthcare is, therefore, quite diverse and requires the participation of a wide variety of personnel in addition to providers, including women's health nurse practitioners (WHNP), midwives, labor & delivery nurses, administrative staff, clinic nurses, and medical assistants as well as corps staff. It also requires an array of ancillary services and additional provider staff, such as pediatrics, anesthesiology, social work, lactation consultants, pharmacy services, laboratory services including a robust blood bank capability, genetics counselors, and qualified obstetric ultrasound technicians. The absence of any one of these services or providers directly impacts our ability to deliver OBGYN care.

We have traditionally had our Family Medicine colleagues provide collaboration in OB care both for clinic visits and delivering babies. This support is no longer consistent or reliable for several reasons: the advent of the Medical Home Port has placed significant demands on Family Medicine time, available clinic space, and support staff resources; the current deployment tempo of Family Medicine physicians is demanding; and many Family Medicine physicians no longer receive OB training as part of their residency education. Moreover, Family Medicine is currently an undermanned

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specialty, which has severely restricted their availability for OB services. Historically, we have also been able to rely on our WHNP colleagues, but as the Navy converts the remaining WHNP billets to Family Health NP billets (who do not care for OB patients), that resource is longer available to us. A dwindling number of OB providers leads to increased referrals to the network and less ability to provide gynecological care to our women Sailors.

Resource management includes the efficient utilization of personnel and time. Personnel for OB care in the Navy system are comprised of both active duty and civilian providers and support staff. While the procurement of physicians is a relatively smooth process, as most are active duty, the addition of any contract or GS employee into the Navy fold is flummoxed by the process of attainment— lasting from one month at the quickest of commands to more than six months at others. This, coupled with relatively low salaries compared to local market equivalents, make the hiring process onerous and challenge our ability to obtain and maintain both numbers and excellence in quality of personnel.

Per MGMA (Medical Group Management Association) analysis, the recommended support staff to provider ratio for an OBGYN practice is 3.4:1. Currently, most OB clinics at Navy MTFs are upside down with this ratio. This means physicians and other providers are not only taking care of patients, but often acting as their own clerks, nurses, and secretaries. This results in less time interacting directly with patients and spending valuable time inefficiently.

So, while we have excellence in quality of service, we face challenges in maintaining that quality—challenges in time management, personnel utilization, and data collection. Time seems to be the most difficult resource to manage well, and degradation in time management has dovetailed with the advent of the electronic medical record (EMR). The EMR has greatly improved documentation and legibility, but for our military patient population, the real benefit is the ability of a provider in Japan to be able to know what the previous provider in Pensacola had to say about the patient's care. However, this EMR was designed for primary care and not for OB or consultation care (which is provided by the gynecologist). This has resulted in a much longer time requirement for each clinic encounter for the OBGYN patient. Moreover, the advent of AHLTA has reduced the number of OB patients that can be seen in an average clinic day by half and the number of gynecology patients by one-third. In addition, the outpatient EMR (AHLTA) and the inpatient EMR (Essentris®) do not communicate with each other electronically, which increases the workload for a provider as they admit a patient into the hospital for care.

As Navy OBGYN providers, we are uniquely positioned to care for our burgeoning numbers of women service members, as we understand the exceptional demands placed on both our patients and ourselves: demands from deployment tempo, living in austere environments, shipboard experience, separation from family and friends, and frequent PCS moves. Currently, our specialty is perceived to be over-manned, but it may instead be under-billeted as the delivery of OBGYN care shifts away from Family Medicine and the number of paraprofessionals supporting OBGYN care diminishes. As a result, we should consider the conversion of available billets to OBGYN billets, and, as the WHNP billets go away, consideration must also be given to increasing the number of midwife positions. As we continue to pursue excellence in patient care for our OBGYN patients, these challenges are surely surmountable.

SKILLS AND METHODS

– DISASSEMBLING GLOBAL BILLS

Many analysts within the MHS are inclined to report cost and workload data segregated by whether the care was inpatient or outpatient. This segregation is usually indistinguishable in purchased care data for professional services, where payment rules obscure that distinction, especially with respect to the obstetrics product line.

Providers who seek reimbursement from TRICARE are generally required to follow HIPAA's rules for the submission of claims data. These rules include the concept of global payments for most procedural care. A global payment is one where the CPT code, relative value units (RVUs), and payment represent the complete package of routine services, including expected routine preprocedure and follow-up visits. When providers submit global bills, they are generally not allowed to submit

separate claims for the pre-procedure and follow-up visits. As a result, when the primary procedure being billed is an inpatient procedure, this billing practice blurs the line between inpatient and outpatient services.

Obstetrics is a product line that is particularly affected by global billing. That is because, unlike most types of procedures, deliveries have many pre-procedure visits (roughly 12 visits). When a provider submits a global obstetrical bill, the dates of care represent the date of the delivery (Table 1). Moreover, the place of service is marked inpatient, because the principal procedure was inpatient. Consequently, visits are not counted for global codes because of the place of service used. However, since the global bill represents the entire package of care, the RVUs and costs on the record actually represent both inpatient and outpatient care.

As a result, analysts can't simply count obstetrical visits, RVUs, and costs in purchased care data using the place of service, as the results would be misleading. Rather, the data must be disassembled to properly make the distinction. There is no perfect way to disassemble global records to allow discrete reporting of inpatient and outpatient care. Assumptions must be made. In the absence of other information, most analysts will assume "business as usual". That is, the patient will have scheduled visits one per month during the first seven months of pregnancy, two per month in the 8th month, and four in the 9th month, for a total of 12 assuming that the mother would not show up for prenatal care during the first month of pregnancy, when she might not yet know of her condition. Normal postpartum care could also be assumed (usually one visit for a vaginal delivery and two for a C-section), for a total of 12-13 outpatient visits associated with each global CPT code reported.

To estimate outpatient and inpatient RVUs, additional codes and values may be helpful. Using the CMS RVU table (http://www.cms.gov/PhysicianFeeSched/), weights can be obtained for each CPT code.[1] A selection of relevant codes and their work RVU values are listed in Table 2.

Using the global vaginal delivery CPT code (59400) as an example, the inpatient RVUs would need to be reflective of both the delivery itself and the rounds visits that are associated with it. Since the average length of stay for an uncomplicated delivery is about two days, assume one rounds visit (no rounds visit while the baby is actually being delivered). Adding the vaginal delivery only RVUs (CPT code 59409) to the RVUs for one rounds visit results in a total estimated inpatient RVU of 21.60 (18.82 + 2.78). The remainder of the global RVU (27.67) would be assumed to be associated with outpatient care.

Finally, now that RVUs have been estimated for inpatient and outpatient professional services, payment and billing amounts can also be apportioned on the basis of RVUs (Table 3). For example, if the amount paid for the professional fee associated with a vaginal delivery was $1500, then the percentages that were estimated for inpatient and outpatient RVUs could be applied to separate costs as well.

Table 1. Notional TRICARE Data

CPT Code	Description	Begin Date	End Date	Place of Service	Total RVU[2]	Number of Visits
59400	Vaginal delivery, full package	2/1/2011	2/1/2011	Inpatient	49.27	0
59510	C-Section, full package	2/1/2011	2/1/2011	Inpatient	54.38	0

Table 2. RVU Table

CPT Code	Description	Total RVU
59400	Vaginal delivery, full package	49.27
59510	C-Section, full package	54.38
59409	Vaginal delivery only	18.82
59514	C-Section, delivery only	21.13
99221	Low intensity rounds	2.78

Table 3. Disassembled Global Bill

CPT Code	Description	Total RVU	% Total	Amount Paid
59400	Vaginal delivery, full package	49.27	100%	$ 1,500
59409	Vaginal delivery only	18.82	38%	$ 573
99211	Low intensity rounds	2.78	6%	$ 85
IP Total	**Total inpatient professional**	**21.60**	**44%**	**$ 658**
OP Total	**Total ambulatory professional**	**27.60**	**56%**	**$ 840**

[1] For most types of care, using the MHS RVU table is more appropriate. However, for obstetrical care some of the RVU values have been set to 0 to accommodate improper reporting of obstetrical care.
[2] "In Office Practice Expense" RVUs were used to calculate total RVUs since obstetrical care is inpatient in nature.

DATA AND INFORMATION SYSTEMS

– THE AVAILABILITY OF GESTATIONAL AGE AND ESTIMATED DUE DATE IN MHS DATA SOURCES

An accurate assessment of **gestational age (GA)** and **estimated due date (EDD)** (sometimes referred to as **estimated date of confinement (EDC)**) is necessary to better facilitate capacity management and planning and to adequately evaluate perinatal care. In the sections below, information is provided on the availability of GA and EDD data, or data that can be used to estimate GA and EDD, in various MHS administrative data sources. Ongoing efforts to capture GA and EDD from these data sources are also noted, as well as issues encountered during the collection process.

Gestational Age and Estimated Due Date

Gestational age (GA), or the age of the fetus, can be calculated from the first day of the **last menstrual period (LMP)** or by measuring the fetus or gestational sac using ultrasound. EDD – the date that spontaneous labor is expected to occur – can be calculated using an estimate of GA or by adding a specified number of days to other important dates, such as LMP and date of conception. GA, EDD, and other important data elements (e.g., LMP) used to calculate these measures may be found in various MHS administrative data sources. However their availability is often inconsistent and incomplete, or suffers from inherent inaccuracies. For example, calculating GA using only LMP information is problematic for women with irregular menstrual cycles and for women who cannot remember the first day of their last period. GA may later be adjusted if GA calculated from the LMP method is substantially different from first-trimester ultrasound measurements. Moreover, the electronic systems used to capture pre-natal encounters do not allow consistent documentation of these data elements at every pre-natal visit, making system-wide collection of this information difficult and resulting in inaccurate information when adjustments to GA are made.

Direct Care Electronic Records in AHLTA, CHCS, and Essentris®

AHLTA: GA and EDD can be documented in AHLTA 3.3 in the OB Summary Module. The OB Summary Module links together information from the Screening and Vitals Signs Entry Modules and other OB specific intake forms. GA and EDD are calculated from the LMP captured in the Screening and Vitals Signs Entry Modules. In addition to the "Calc EDD" field, there is also a "Curr/Rev EDD" field, which indicates a revised EDD, but no field indicating reason for revision. The flowsheet of the OB Summary Module displays GA for every outpatient encounter date. The OB Summary Module is read-only and can be generated for any pregnant patient during an outpatient visit. However, the provider must click the module icon to retrieve the necessary data to populate the module. *Moreover, LMP information must be entered into the Screening and Vitals Signs Entry Module in order for GA and EDD to be calculated*. It is not clear how often providers use this functionality to generate OB Summary Module flowsheets.

CHCS: GA and EDD can also be documented in CHCS, primarily through free text entry. This information is usually noted in the reason for appointment field. There is a CHCS data field in the Ambulatory Data Mart (ADM) specific to LMP; however, it is not known how often this field is used when a record of the patient encounter is captured using direct entry into the CHCS ADM.

Essentris®: Essentris® is used by some facilities to capture inpatient clinical documentation. Essentris® can be configured to capture GA during the inpatient stay, which is important because it is a great predictor of neonatal length of stay, utilization of special care services, complications, and long term health outcomes—all indicators of the quality of perinatal care. Essentris®is not available enterprise-wide, nor is it consistently configured to capture the same information.

Electronic Data Marts and Data Repositories – CDM, MDR, and M2

The Clinical Data Mart (CDM) includes the field LAST_MENTRUAL, which is rarely populated with data. There were plans for version 2.0 of the CDM to begin ingesting Last_period_date from the Female Vitals Entry Module of AHLTA, but these plans have been halted with the upcoming decommissioning of the CDM. Neither the MHS Data Repository (MDR) nor the MHS Data Mart (M2) contains GA, EDD, or LMP data fields. Moreover, there are no current plans to include LMP information from AHLTA or any gestational age or

calculated or revised EDD information from AHLTA's OB Summary Module into any existing data mart or repository. This omission severely limits utilization predictions and capacity planning for OB care and services.

CHCS and Essentris® Data Mining Efforts

The Navy currently has a contract to develop a decision support tool for managing facility capacity. Analysts were tasked with mining CHCS and Essentris® for GA and EDD/EDC. This data mining effort has been performed at select Navy MTFs (San Diego, Camp Pendleton, and Camp Lejeune). Using primarily free-text data mining, GA, EDD/EDC, and LMP information is collected from the CHCS ADM. In CHCS, this information is most often noted in the reason for appointment field. It was also found that this information is often noted multiple times in multiple formats in more than 50 percent of pregnant female records. LMP, GA, and EDD/EDC are often recorded in the earliest pre-natal screening/visit records, while only GA or EDD/EDC is noted in later pre-natal encounter records.

Summary

While opportunities currently exist to record and capture GA and EDD information during the patient encounter, it is clear that much of these data are captured inconsistently and intermittently. Moreover, system-wide collection of these data is hindered by stand-alone clinical documentation systems that often require site-by-site ad hoc queries. Depending on the goal of data collection (e.g., capacity management and forecasting or the evaluation of the quality of perinatal care), recommendations to improve collection of this information include engaging clinical leaders, MTFs, and staff of appropriate clinics to consistently collect GA, EDD/EDC, and LMP information during the patient encounter using existing clinical documentation systems. In addition, advocating new requirements to MHS automated information systems is necessary to facilitate system-wide availability of GA and EDD information for analysis.

NEW KNOWLEDGE

– NOTED PUBLICATIONS

Two recent government publications noted below provide national statistics on pregnancy and childbirth trends in the United States.

Hospitalizations related to childbirth, 2008.

Podulka J, Stranges E, Steiner C.
HCUP Statistical Brief #110. April 2011. Agency for Healthcare Research and Quality, Rockville, MD.

Using a nationwide hospital discharge dataset, the authors found that the proportion of hospital stays among women who delivered via cesarean section (C-section) was 33 percent of all childbirth stays in 2008 – a 72 percent increase from a C-section rate of 21 percent in 1997. Noting a variation in rates by payer, C-sections accounted for 34 percent of all privately-insured births, but only 28 percent of uninsured births. Moreover, the increase in repeat C-section delivery was coupled with a decrease in the rate of vaginal births after Cesarean (VBACs), which fell to 1 percent of all deliveries in 2008. Reflecting changing practice patterns, there was also a 32 percent decrease in the use of forceps and a 60 percent decrease in episiotomies, a surgical incision performed during childbirth, during the 10-year period evaluated.

Read more about this publication at http://www.hcup-us.ahrq.gov/reports/statbriefs/sb110.pdf.

Are preterm births on the decline in the United States? Recent data from the National Vital Statistics System.

Martin JA, Osterman MJK, Sutton PD.
NCHS Data Brief #39. May 2010. National Center for Health Statistics, Hyattsville, MD.

The authors used birth certificate data to evaluate the change in preterm birth rates (less than 37 weeks of gestation) from 2006 to 2008. Following a long period of fairly steady increase, the U.S. preterm birth rate declined in 2007 (from 12.8 to 12.7 percent), and then again in 2008 (to 12.3 percent), marking the first 2-year downturn in this rate in nearly three decades. Declines

in preterm birth rates from 2006 to 2008 were observed for mothers of all age groups under age 40, for the three largest race and Hispanic origin groups, and for the majority of all states. Previous research has suggested that increases in preterm induction of labor and C-section delivery contributed to the rise in the overall preterm birth rate, and decreases in the use of these procedures before 37 weeks could potentially reduce the preterm birth rate. This report notes that the decline in the overall preterm rate from 2006 to 2008 was related to declines in all types of delivery—preterm C-section delivery and induced and noninduced preterm vaginal births.

Read more about this publication at http://www.cdc.gov/nchs/data/databriefs/db39.htm.

TIPS AND TRICKS:

– USING UNIONS IN M2

M2 offers three ways to combine queries into a single data cube available in an M2 report: unions, intersections, and differences. This issue addresses unions, which allow the user to run multiple queries, even against different classes, in order to get a combined answer which "adds up" the results of the queries. As noted below, unions are not true addition, so care must be taken in how unions are used; however, they do provide a winning strategy for many analytic questions.

Creating a union of queries in M2 appears simple, but care must be taken or the answers will not be what they seem. This is because the union of two queries is not truly just the additive sum of the data each would produce on its own. Usually, it will work out that way, but if the two data cubes that the queries would have produced individually have one or more rows that are identical, the union will discard one of each duplicate pair of rows without adding it into the total. *(Note: This is most likely to happen when granular data are pulled.)* Consequently, care must be taken when planning unions to think through whether it is possible that a row from one query might, by chance, be exactly duplicated with a row from one of the other queries.

- The first step is planning and building the queries. The first of the query panels is constructed normally and can have both dimension and measure objects in the results box, as well as any applicable conditions. Then, the "combine queries" icon is selected to open a new query panel.

- The next query can be built from a different class and have entirely different conditions, but the **results objects must be in the exact same order as in the original query**, even if the object names are not the same in the new class. *(Note: M2 will treat each query panel's results objects as a single column in the data cube in the order that they appear in the multiple query panels, but use the object names from the first query panel.)*

CREATING UNIONS – EXAMPLE

Illustration/Exercise:
The following example uses a union to combine queries from two classes (the SIDR and SADR) to calculate total direct care maternity costs for multiple years.*

1. Create a query (Query 1) from the SIDR class using the following objects, in this order: "FY", "MDC", and "Full Cost, Total". Add conditions so that FY InList"2009, 2010" and MDC InList "14, 15". *(Note: Major Diagnostic Categories (MDCs) of 14 and 15 are usually used to identify maternity care).*
2. Click the "combine query" icon, and a new query panel will be created with "U" preceding a new Query 2 tab.
3. The new Query 2 panel will automatically start with the same results objects as Query 1, and from the very same class (SIDRs). Replace the results objects with objects from the desired class (SADRs) using the same order: "FY", "MDC", and "Full Cost, Total". If desired, the "combine query" icon could be used to add additional union queries for purchased care (TED-I and TED-NI) to get total maternity costs for the MHS.
4. Run the query.

CREATING UNIONS – EXAMPLE (CONT.)

5. When the data cube is returned and displayed in the Report Manager view, it will have only a single table, with "FY", "MDC", and "Full Cost, Total" columns (and in this case, with rows for every combination of FY and maternity MDCs, but the SIDR and SADR costs will be combined into a single sum for each row.)

Tip: It may be desired to show how much cost each of the classes is contributing to the total shown on each row. A way to do that is to include another dimension object in the results. A different object must be carefully chosen in each class so that it will have a different value than the object chosen for the other classes, even though it is placed in the same sequence in the results window.

6. Return to the Query Panel view. Add "Gender" to the SIDR query, and add "Appointment Status Type" to the SADR query (all results objects must be in the same sequence but from the same class as the other objects in that query). Re-running the query produces Table 1.

7. Now, the "Gender" column can be grouped so that the SIDR's genders ("M", "F") are renamed "SIDR" and the SADR's appointment status types ("Seen", "Telcon") are renamed "SADR". These groupings produce Table 2 (with calculators added using slice-and-dice).

Caution: If Person ID (or some other granular object) was included in the original queries to get the maternity cost for each person, and for some person, the SIDR total cost happened to be exactly the same as the SADR total cost, M2 would view the rows as duplicates and discard one. *(Note: this would not happen in the refined example where "Gender" was added to the SIDR query and "Appointment Status Type" was added to the SADR query, since the SIDR and SADR could not have the same values for those objects in any row.)*

**Though SADRs are used in this example as a source of direct care maternity costs, the newly added Comprehensive Ambulatory Professional Encounter Record (CAPER) class in M2 also contains direct care costs. It should be noted that the CAPERs will replace the SADRs in upcoming M2 universe updates.*

Table 1. Total Maternity Cost (Original Query)

		14	15	Sum:
2009	F	$414,216,673	$136,104,209	$550,320,882
2009	M		$153,737,204	$153,737,204
2009	SEEN	$183,502,197	$8,473,360	$191,975,557
2009	TELCON	$1,191,948	$146,257	$1,338,204
2010	F		$141,842,717	$585,476,815
2010	M	$443,634,097	$165,254,410	$165,254,410
2010	SEEN	$213,776,934	$14,161,580	$227,938,514
2010	TELCON	$1,423,495	$151,619	$1,575,115

Table 2. Total Maternity Cost (Grouped)

		14	15	Sum:
2009	SADR	$184,694,144	$8,619,616	$193,313,761
	SIDR	$414,216,673	$289,841,413	$704,058,087
	Sum:	$598,910,818	$298,461,030	$897,371,848

		14	15	Sum:
2010	SADR	$215,200,429	$14,313,199	$229,513,628
	SIDR	$443,637,097	$307,097,128	$750,731,225
	Sum:	$658,834,526	$321,410,327	$980,244,853

Sum:	$1,257,745,344	$619,871,356	$1,877,616,701

KNOWLEDGE SOURCES

Below are upcoming conferences for professional growth and development.

Related to this issue's theme –
October 23-26, 2011: The American Congress of Obstetricians and Gynecologists (ACOG) 2011 Armed Forces District Annual Meeting – San Diego, CA
http://www.acog.org/acog_districts/dist_web.cfm?recno=8

October 19-20, 2011: Military Electronic Health Records Conference – Washington, DC
http://www.ttcus.com/view-conference.cfm?id=152

October 22-26, 2011: 33rd Annual Meeting of the Society for Medical Decision Making – Chicago, IL
http://www.smdm.org/2011meeting/index.shtml

October 29-November 2, 2011: American Public Health Association Annual Meeting and Exposition – Washington, DC
http://www.apha.org/meetings/AnnualMeeting/

November 6-10, 2011: The Society of Federal Health Agencies (AMSUS) Annual Meeting – San Antonio, TX
http://www.amsus.org/index.php/annual-meeting

November 13-16, 2011: INFORMS 2011 Annual Meeting – Charlotte, NC
http://meetings2.informs.org/charlotte2011/

December 5-6, 2011: 8th Annual American Healthcare Conference & Exhibition – Anaheim, CA
http://www.worldcongress.com/events/HR11005/index.cfm?confCode=HR11005

December 4-7, 2011: Institute for Healthcare Improvement (IHI) 22nd Annual Forum on Quality Improvement in Health Care – Anaheim, CA
http://www.ihi.org/offerings/Conferences/Forum2011/Pages/default.aspx

January 30-February 2, 2012: 2012 Military Health System Conference – National Harbor, MD

February 20-24, 2012: Annual HIMSS Conference & Exhibition – Las Vegas, NV
http://www.himssconference.org/?src=hwnav

IN THE NEXT ISSUE...

The next issue of *Healthcare Analytics in Navy Medicine* will focus on identifying and quantifying pharmaceutical services delivered by Navy Medicine to its beneficiaries. Understanding the changing medication needs, as well as challenges related to the cost and appropriate utilization of drug therapies, for the Navy's beneficiary population is essential to mission readiness and improved clinical, economic, and humanistic outcomes. The next issue will highlight current policy and practice issues related to pharmaceutical care and feature skills and tools available to analysts to address these issues.

Editor:
Robert D. Willis

Managing Editor:
C. Allison Russo

Presentation Designer:
Liz Ritter

Contributors:
Elizabeth Adriano, Wendy Funk, Rich Holmes, Amy O'Boyle, Allison Russo, Robert Willis

Deputy Chief for Resource Management/Comptroller, Bureau of Medicine and Surgery
Joseph B. Marshall, Jr.

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